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SPECIFICATION FOR CHROMATE CONVERSION COATINGS ON ELECTROPLATED ZINC AND CADMIUM COATINGS

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SPECIFICATION FOR CHROMATE CONVERSION COATINGS ON ELECTROPLATED ZINC AND CADMIUM COATINGS

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SPECIFICATION FOR CHROMATE CONVERSION COATINGS ON ELECTROPLATED ZINC AND CADMIUM COATINGS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 4 June 1981, after the draft finalized by the Metallic Finishes Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Coatings of zinc and cadmium are chromate treated in order to retard the formation of corrosion products on the exposed surfaces of these coatings in corrosive atmospheres. Chromating is particularly effective in retarding the formation of white corrosion products which appear on zinc and cadmium coatings under certain conditions.

0.3 While preparing the standard, necessary assistance has been derived from ISO 4520·2 Chromate conversion coatings on electrodeposited zinc and cadmium coatings, issued by the International Organization for Standardization.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies requirements relating to chromate conversion coatings on zinc and cadmium intended to give protection against corrosion. Finishes for giving particular colour or specifically to improve paint adhesion are not covered by this standard.

2. METHOD OF APPLICATION OF COATINGS

2.1 Chromate conversion coatings are normally applied by dipping. Chromating solutions are usually acidic and contain hexavalent chromium

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*Rules for rounding off numerical values (*revised*).

salts together with other salts which may be varied to modify the appearance and hardness of the film. The colour of the film and, therefore, the type of conversion coating depends on the composition of the chromating solution, but is also affected by its pH and temperature, the duration of treatment and the nature and surface condition of the coating being treated. Bright, transparent films on zinc coatings may be obtained by dipping in appropriate solutions. They can also be obtained by bleaching iridescent films in alkaline solutions or in phosphoric acid.

2.2 When hot water is used as the final rinse after the chromating process, it is essential that the time of rinsing should be kept as short as possible in order to prevent the dissolution of the hexavalent chromium. The drying of the article shall not be carried out at a temperature in excess of 60°C as this would result in cracking due to dehydration of the chromate coating. (Any heat treatment for the relief of hydrogen embrittlement shall be carried out before a chromate conversion coating is applied).

3. TYPES OF CHROMATE CONVERSION COATING

3.1 Finishes may be applied ranging from thick, dark, olive-green coatings with good protective properties to thin, transparent, sometimes bluish films of attractive appearance but with limited protective value. Finishes have been classified into four types; their most important characteristics are given below:

Type	*Typical Appearance*		**Approximate Film Density* g/m^2	*Typical Chromium Content* mg/m^2
A clear	Colourless	Transparent clear, sometimes with a bluish tinge	Up to 0·5	5
B bleached		Transparent with slight iridescence	Up to 1·0	5 to 10
C iridescent	Coloured	Yellow iridescent	0·5 to 1·5	50 to 100
D opaque		Olive green, shading to brown or bronze	More than 1·5	100 to 200

(*Reference may be made to IS : 9838 - 1981 'Method for determination of coating mass per unit area of conversion coatings on metallic materials by gravimetric method'.)

4. USE OF CHROMATE CONVERSION COATINGS

4.1 The chromate conversion coatings which give most protection are types C and D, and these only give any significant increase in life to electroplated components. Types A and B are used when appearance is the main consideration. They give some protection against high humidity in mildly corrosive conditions and help bright deposits to retain their appearance, for example, by providing protection against staining or handling.

5. REQUIREMENTS FOR CHROMATE CONVERSION COATINGS

5.1 General — Chromate conversion coatings harden with age by gradual dehydration. They should, therefore, be handled carefully for the first 24 hours after treatment, and any tests (including corrosion tests) shall be deferred until the expiry of that period.

5.2 Adhesion — The coatings shall be adherent, and coloured coatings shall be tested by one of the methods specified in IS : 8602-1977*.

5.3 Corrosion Resistance

5.3.1 *Zinc Coatings*

5.3.1.1 *Coloured coatings* — Coloured coatings (Types C and D) on zinc coatings shall be subjected to neutral salt spray test specified in IS : 9844 - 1981†. White corrosion products shall not be visible within 96 hours.

5.3.1.2 *Colourless coatings* — Colourless coatings (Types A and B) on zinc coatings shall be subjected to the neutral salt spray test without breakdown of the coatings or any appearance of white corrosion products within 12 and 24 hours respectively (for details of procedure, reference may be made to IS : 9844 - 1981†).

5.3.2 *Cadmium Coatings*

5.3.2.1 Coloured coatings (Types C and D) and colourless coatings (Types A and B) on cadmium coatings shall be subjected to humidity test at a temperature of 55 ± 2°C followed by cooling to 30°C (5 hours). There will be 2 cycles of 16 hours each where the relative humidity shall not be less than 95 percent with condensation. There shall be no breakdown of the film or any appearance of the white corrosion products (white rust), slight staining may be allowed.

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*Method of testing chromate coatings on zinc and cadmium.

†Methods of testing corrosion resistance of electroplated and anodized aluminium coatings by neutral salt spray test.

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